opportunity for manipulation than with the price of terminating service above cost. If traffic is balanced, the price is irrelevant. Decreasing the incentives for traffic manipulation will tend to increase the balance of the traffic and reduce the significance of the difference between cost and the zero compensation rate. With mutual compensation rates above cost, the monopolist has an incentive to send as much traffic as possible to its own affiliate and as little traffic as possible to the competitors of its affiliate. With sender keep all, the monopolist has no incentive to send traffic to an affiliate. The monopolist does have an incentive to refuse to accept terminating traffic, but the interconnection requirement implies an obligation to terminate any traffic that is presented.

B. Peak Usage Measurement

The recent NYNEX-Teleport interconnection arrangement provides an example of a combination of usage charges and sender keep all arrangements. The general form of the agreement is to establish a particular charge for a two-way channel of given capacity between the two companies. Traffic is measured at the busy hour each month and the relative measurements are used as an allocation factor for the established channel rate. If traffic is exactly balanced, the payments to each company cancel out and the level of the established rate is irrelevant. If traffic is not balanced, and if Teleport, for example, sends more traffic to NYNEX than it receives from NYNEX at the busy hour, that imbalance is used to compute a net payment from Teleport to NYNEX.

The agreement is essentially a sender keep all arrangement for non-peak traffic. Because relative traffic is only measured at the peak hour, either company can increase its traffic to the other at non-peak times without affecting the charges due. For peak traffic, the agreement is essentially a per minute compensation scheme. An increase in peak period traffic from NYNEX to Teleport, for example, without a corresponding increase in the other direction, changes the financial flows between the companies in the same way that a per minute charge for peak terminating traffic would do.

The distinction between peak and off-peak traffic is beneficial for administrative simplicity and for economic efficiency. Costs are generally associated with peak traffic and therefore the effectively zero charge for terminating off-peak traffic is cost based.

While the structure of the NYNEX-Teleport agreement is beneficial for equating termination charges to cost during the off-peak period, it does not in itself solve the problem of increasing market power through high charges discussed in the previous sections. If the established price for a channel of given capacity is set far above cost, then the company with market power could engage in the same kind of manipulation discussed above. For example, with a very high priced channel, NYNEX could choose to not terminate traffic through Teleport during the peak hour while Teleport would have little choice but to terminate traffic through NYNEX. That could cause Teleport to pay rates for termination that were high enough to reduce the benefits of competition.

If the established price for a channel of given capacity is near the real cost, then the NYNEX-Teleport arrangement provides an attractive model for general interconnection issues. It would approach a cost-based interconnection fee for both peak and off peak traffic, leading to economic efficiency and opportunities for pricing innovations.

VI. Conclusion

When the market is composed of segments that are monopolized and segments subject to competition, interconnection and compensation arrangements are critical to the development of effective competition. A good interconnection policy will allow effective competition in the potentially competitive segments of the market while a poor interconnection policy will allow the monopolist of part of the market to extend its monopoly into potentially competitive sectors of the market. This paper has shown that the theoretically correct policy is mutual compensation at cost based rates and that mutual compensation alone is insufficient to limit monopoly power. A desirable interconnection policy should be closely related to the theoretically correct policy and also take account of the practical problems of administrative feasibility and of the definition and measurement of cost.

Several specific conclusions can be drawn from the analysis of this paper:

(1) If there are no regulatory controls on compensation for interconnection, the monopolist of part of the market can extend its monopoly power to the entire market;

(2) A mutual compensation policy without limits on the level of rates does not limit market power;

(3) The level of rates under a mutual compensation policy is unimportant if and only if the level of incoming and outgoing traffic is exactly balanced. Because traffic levels will rarely, if ever, be exactly balanced, the level of rates will be an important factor in the viability of competition;

(4) A mutual compensation policy with prices limited to the cost of service is the theoretically correct compensation policy. Mutual compensation with prices limited to the cost of service prevents the monopolist of part of the market from extending its market power to potentially competitive sectors of the market;

(5) Capacity charges rather than per minute charges allow attention to be focused on the cost of service at the peak load which is generally the real cost of service;

(6) "Sender keep all" is an administratively simple mutual compensation scheme with zero prices for terminating service. It is an attractive approximation to the theoretically correct policy of cost based prices when the incremental cost of terminating service is low.

APPENDIX

Brief Summary of Past Interconnection Compensation Efforts

Interconnection issues have played a crucial role in competitive viability and in pricing policy throughout the history of the telecommunication industry. Interconnection disputes began with the early efforts to expand market power in the telegraph industry through limits on interconnection rights and continued through the Bell companies' early twentieth century denial of interconnection to independent telephone companies, the development of legal rights to interconnection, the private line and CPE interconnection controversies of the 1970's, and the development and implementation of the access charge system during the 1980's.

The 1980 Computer II decision to remove CPE from Title II regulation included the decision to eliminate the support flows that had previously gone from CPE to other parts of the industry. Customers gained the right to interconnect any amount of CPE (so long as it met specified technical standards) to the public network with no specific interconnection charge. Customers still had to pay the tariffed local rates for service, but CPE was "carved off" from the public network. That decision was made in the context of a monopoly public network and a potentially competitive CPE component. Without the interconnection requirements, the monopoly local network provider could also monopolize the CPE, but with the requirements, the CPE market could develop in a competitive way independently of the actions of the monopoly local network providers.

It would have been possible to apply the CPE model to long distance interconnection (allowing the competitors to interconnect at ordinary local rates as MCI originally requested in its Execunet service), but that would have eliminated the established system of revenue flows from long distance to local service. The decision first to allow AT&T to impose the ENFIA tariff rather than local rates for long distance interconnection, and then the development of the access charge system, implied a desire to maintain the system of revenue flows from long distance to local service. The access charge system together with the MFJ restrictions on BOC participation in long distance service allowed the long distance market to develop competitively without interference from the local exchange companies, but did not force prices to the true cost of service as normally happens in a competitive market.

Both the CPE and long distance controversies occurred in a market structure in which one party (the local exchange) was assumed to have monopoly power and the other party (the CPE user or long distance provider) was assumed to operate in a competitive market. Thus the policy concern was to ensure that the competitor could receive access to the monopolized market at an appropriate price. The international model provides a more equal example in which both parties are assumed to have market power. So long as AT&T was the only U.S. carrier for international telephone traffic, it could bargain over the compensation scheme with monopoly entities in foreign countries on an equal basis. However, the beginning of competition in the U.S. for international calls increased the bargaining power of the foreign carriers. The foreign carrier was no longer restricted to dealing with AT&T for U.S. traffic but could agree to send traffic to the U.S. carrier that offered the foreign monopoly carrier the most favorable terms. This possibility created considerable concern at the FCC over whether the beginning of international competition in the U.S. would only benefit foreign carriers and not U.S. customers. Evan Kwerel's 1984 analysis of the international market concluded:

> This paper raises serious questions about the wisdom of deregulating U.S. international telecommunications without considering whether this will increase the market power of foreign telecommunications authorities. Increased competition among U.S. suppliers of international telecommunications services is likely to result in a reduction in the U.S.'s share of the benefits from such services unless the U.S. government takes appropriate countermeasures.[6]

The concerns raised in Kwerel's 1984 paper later developed into extensive FCC efforts to prevent monopoly foreign carriers from taking advantage of their unequal bargaining position with competitive U.S. carriers. The Commission found that equal payment in each direction was inadequate protection against manipulation for a monopolist of one side and sought to bring the rates paid for international terminating service down to the level of cost.

[6]Evan Kwerel, "Promoting Competition Piecemeal in International Telecommunications," FCC, OPP Working Paper 13 (December 1984), p. 49.

Incremental Cost Of Local Usage

Gerald W. Brock
March 16, 1995
(Prepared for Cox Enterprises)

Summary

A reasonable estimate of the average incremental cost of local usage (and therefore the cost of terminating traffic received from a competitor) using digital technology is 0.2 cents per minute. That estimate is based on studies done by or supported by telephone companies. The cost is determined by peak period capacity and therefore the true cost is considerably higher than the 0.2 cents per minute average during the peak period and is zero during the non-peak period.

I. Introduction

In a separate paper prepared for Comcast, I have argued that the theoretically correct interconnection charge is cost based mutual compensation. However, cost can have many different meanings and in a regulatory context, cost based requirements can lead to interminable regulatory proceedings and disputes. Policy makers have consequently frequently sought structural methods of solving problems that do not require detailed oversight of cost rules.

One proposed structural rule is mutual compensation without oversight of actual rates, but as shown in the Comcast paper that approach is inadequate to limit the exercise of monopoly power. An alternative approach that dispenses with direct control of cost is the policy of "sender keep all" or "bill and keep" in which each party agrees to terminate traffic for the other without payment for terminating service. That is equivalent to mutual compensation with a zero price for compensation. It will be economically efficient if <u>either</u> of two conditions are met:

(1) Traffic is approximately balanced in each direction;
(2) The actual costs are very low so that there is little difference between a cost based rate and a zero rate.

Existing publicly available studies suggest that the incremental cost of local usage (and therefore the cost of terminating traffic from a competitor) is on average approximately 0.2 cents/minute. The actual cost is considerably higher during the peak period and zero during the off peak period. Thus it would not be efficient or desirable to charge at 0.2 cents/minute on a usage basis. However, the very low average number compared to the price currently charged by local exchange companies suggests that far greater distortions are likely from mutual compensation without control of rates than from sender keep all approaches.

There are two basic methods for estimating cost:

(1) engineering studies of the forward looking cost to supply a particular service;
(2) econometric (statistical) studies of the relationship between observed cost and observed outputs.

Both engineering and econometric studies provide useful information on cost. The engineering study allows one to focus on best practice technology and compute the incremental cost of adding capacity to provide a particular function. Econometric studies provide a reality check by using observed output and cost data rather than projections of expected cost. However, econometric studies may produce less precise estimates of the incremental cost of a particular service than engineering studies because they are measuring the correlation between variations in the total cost of different telephone companies and variations in the quantities of particular services provided by those companies. The cost data include costs for different embedded technologies used by the companies and are not precise enough to provide detailed estimates of the incremental costs of particular services with particular types of technology.

II. Engineering Estimate

The most comprehensive public engineering study of incremental cost was done by the Incremental Cost Task Force with members from GTE, Pacific Bell, the California Public Utilities Commission, and the RAND Corporation.[1] The Task Force had access to data for telephone companies in California and performed a detailed engineering cost study for various output measures of local telephone service. Individual components were priced based on 1988 prices and costs were computed for switch investment, switch maintenance, interoffice transport, and call attempt costs. All costs were computed for calls during the busiest hour of the year because the investment and associated expenses are related entirely to capacity cost. The Task Force computed the following usage costs for each hundred call seconds (CCS) during the busiest hour of the year for "average" and "larger urban" exchanges:

[1] Bridger M. Mitchell, Incremental Costs of Telephone Access and Local Use,(Santa Monica, CA: The Rand Corporation, 1990); reprinted in William Pollard, ed., Marginal Cost Techniques forTelephone Services: Symposium Proceedings (Columbus, Ohio: National Regulatory Research Institute, 1991) (NRRI 91-6).

switch investment	\$5.00 - \$10.00 per year
switch maintenance	.20 - .50 per year
interoffice calling	.50 - .60 per year
Total	\$6.00 - \$11.00 per year

In addition, the task force computed a cost of \$.30 to \$.90 per year for each call attempt during the busiest hour of the year and estimated approximately 1.25 busy hour attempts per busy hour CCS.[2]

There are 8766 hours per year and the ratio of the peak usage rate to the average usage rate is approximately 3.[3] That implies that one busy hour CCS is approximately equal to 2922 CCS per year (8766/3). Because one CCS is equal to 1.67 minutes, costs per busy hour CCS can be converted into average costs per minute by dividing by 4880 (2922 total year CCS times 1.67 minutes/CCS). Thus the \$6.00 - \$11.00 cost per year per CCS during the busiest hour of the year translates into \$.0012 - \$.0023 per minute. The busy hour attempt cost adds \$.375 - \$1.125 per busy hour CCS (1.25 busy hour attempts per buy hour CCS and \$.30 to \$.90 annual cost per busy hour attempt), raising the total cost, including busy hour attempts, to \$6.375 - \$12.125, and the per minute cost to \$.0013 - \$.0025. Taking the middle of the estimated range gives a cost of \$.0019 per minute, or approximately 0.2 cents/minute.

Because the cost is determined by the use peak capacity, the actual cost per minute is much higher at the peak and is zero at the off-peak. If, for example, one assumes that an equal size peak occurs for one hour in each business day (260 hours per year of peak usage and 8506 hours of non-peak usage), then the average cost per minute would be 2.1 cents for the 8.9 percent of the traffic that occurs during the 260 peak hours each year and the average cost per minute would be zero for the 91.1 percent of the traffic that occurs during the 8506 non-peak hours.

A variety of other engineering studies have been done for specific regulatory purposes and submitted to various state regulatory commissions. For example, New England Telephone prepared an engineering study for the Massachusetts PUC that found an incremental cost of 0.2 cents per minute for local usage served by electronic switches,

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[2]Ibid., p. 249, 250.

[3]Rolla E. Park, Incremental Costs and Efficient Prices with Lumpy Capacity: TheTwo Product Case, (Santa Monica, CA: The Rand Corporation, 1994). p.5.

the same as the Incremental Cost Task Force conclusion using California data.[4]

III. Econometric Estimate

Many econometric cost studies of telecommunications have been done, but the procedures used in most of them do not allow an estimate of the incremental cost of local service. One good econometric cost study that does provide an estimate of the marginal cost of local exchange service is the one performed in 1989 by Louis Perl and Jonathan Falk of NERA, using data from 39 companies (24 Bell and 15 non-Bell) over the years 1984-1987. They developed a statistical relationship between the total cost of the individual companies and the access lines, local usage, and toll usage provided by the companies.

Four different models were used for the statistical estimation. In two of the models, the data for each company was averaged over the four year period to eliminate the effects of minor year to year fluctuations and to provide a pure cross section estimate. In the other two models, observations were used for each company in each of the four years creating a mixture of time series and cross section observations. In two of the models, calls were used as the unit of usage measurement and in the other two calls minutes were used as the unit of usage measurement.

The estimated marginal costs for the local minutes ranged from 0.2 cents per minute to 1.3 cents per minute. The costs per call developed in the models using number of calls as the usage unit were divided by the average holding time to produce estimates of cost per minute comparable to those from the models using number of minutes as the usage unit. The lowest estimate came from the model with only cross section observations averaged over the four years. The highest estimate came from the model using all observations in a pooled cross section and time series and using calls as the unit of usage measurement. All four models had good statistical properties. Although there are various advantages and disadvantages of each of the four models, none of the four can be identified as either the clearly correct approach or an approach to be discarded.

The statistical form used by Perl and Falk generates marginal cost numbers approximately equal to average cost numbers. Thus it should be expected that their estimates will be somewhat higher than the engineering estimates of marginal or incremental cost. Furthermore, the engineering estimates generated by the Incremental Cost Task Force were developed based on digital switching technology while the Perl and Falk estimate for local minutes served by electronic switches was based on the embedded

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[4]Reported in Lewis J. Perl and Jonathan Falk, "The Use of Econometric Analysisin Estimating Marginal Cost," in Pollard, Marginal Cost Techniques., op cit.

technology in 1984-1987 which was primarily analog. It is likely that the incremental costs of usage capacity for analog switching are higher than the incremental costs of usage capacity for digital switching.

IV. Conclusion

A reasonable estimate of the average incremental cost of terminating traffic using digital switches is 0.2 cents per minute. That estimate is supported by the engineering studies done with data for California and for Massachusetts and by one of the econometric models developed by Perl and Falk. Other reasonable econometric models using embedded cost data produce somewhat higher cost estimates. The cost is determined by peak period capacity and therefore the true cost is considerably higher than the 0.2 cents/minute average during the peak period and is zero during the non-peak period.

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Multi-State MTAs

1. New York
   NY, NJ, CT, VT, PA
2. Los Angeles
   CA, NV, AZ
3. Chicago
   IL, WI, IN, MI, OH
4. San Francisco
   CA, NV
5. Detroit
   MI, OH
6. Charlotte-Greensboro
   NC, SC, GA
7. Dallas-Fort Worth
   TX, OK, AR, LA, NM
8. Boston-Providence
   MA, RI, NH, VT, ME
9. Philadelphia
   PA, NJ, DE, MD
10. Washington-Baltimore
    DC, MD, VA, WV, PA
11. Atlanta
    GA, SC, TN, AL
12. Minneapolis-St. Paul
    MN, WI, IA, MI, SD, ND
14. Houston
    TX, LA
16. Cleveland
    OH, PA
17. New Orleans-Baton Rouge
    LA, MS, FL, AL
18. Cincinnati-Dayton
    OH, WV, VA, KY, IN
19. St. Louis
    MO, IL, AR
20. Milwaukee
    WI, IA, MN, MI
21. Pittsburgh
    PA, WV, OH
22. Denver
    CO, KS, NE, SD, WY, UT
23. Richmond-Norfolk
    VA, NC
25. Puerto Rico-U.S. Virgin Islands
    PR, VI
26. Louisville-Lexington
    KY, IN, IL
28. Memphis-Jackson
    TN, MS, KY, AL, MO, AR, LA
29. Birmingham
    AL, TN
30. Portland
    OR, WA, CA
31. Indianapolis
    IN, IL
32. Des Moines-Quad Cities
    IA, IL, MO, NE, SD, WI
34. Kansas City
    KS, MO, OK
35. Buffalo-Rochester
    NY, PA
36. Salt Lake City
    UT, WY, NV, ID, OR
37. Jacksonville
    FL, GA
38. Columbus
    OH, WV
39. El Paso-Albuquerque
    TX, NM, AZ, UT, CO
40. Little Rock
    AR, OK
42. Spokane-Billings
    WA, MT, ID, OR, WY
43. Nashville
    TN, KY
44. Knoxville
    TN, KY, VA
45. Omaha
    NE, IA, KS
46. Wichita
    KS, OK
48. Tulsa
    OK, KS
50. Guam-Northern Mariana Islands
    GU, MP

Population Total (1990 Census): 224,248,915
90.16% of U.S. Population

Single State MTAs

13. Tampa
    FL
15. Miami
    FL
24. Seattle
    WA
27. Phoenix
    AZ
33. San Antonio
    TX
41. Oklahoma City
    OK
47. Honolulu
    HI
49. Alaska
    AK
51. American Samoa
    AS

Population Total (1990 Census): 24,460,958
9.84% of U.S. Population

State	MTAs covering state
Alabama	Atlanta (11), New Orleans (17), Memphis (28), Birmingham (29)
Alaska	Alaska (49)
Arizona	Los Angeles (2), Phoenix (27), El Paso (39)
Arkansas	Dallas (7), St. Louis (19), Memphis (28), Little Rock (40)
California	Los Angeles (2), San Francisco (4), Portland (30)
Colorado	Denver (22), El Paso (39)
Connecticut	New York (1)
Delaware	Philadelphia (9)
District of Columbia	Washington DC (10)
Florida	Tampa (13), Miami (15), New Orleans (17), Jacksonville (37)
Georgia	Charlotte (6), Atlanta (11), Jacksonville (37)
Hawaii	Honolulu (47)
Idaho	Salt Lake City (36), Spokane (42)
Illinois	Chicago (3), St. Louis (19), Louisville (26), Indianapolis (31), Des Moines (32)
Indiana	Chicago (3), Cincinnati (18), Louisville (26), Indianapolis (31)
Iowa	Minneapolis (12), Milwaukee (20), Des Moines (32), Omaha (45)
Kansas	Denver (22), Kansas City (34), Omaha (45), Wichita (46), Tulsa (48)
Kentucky	Cincinnati (18), Louisville (26), Nashville (43), Knoxville (44)
Louisiana	Dallas (7), Houston (14), New Orleans (17)
Maine	Boston (8)
Maryland	Philadelphia (9), Washington DC (10)
Massachusetts	Boston (8)
Michigan	Chicago (3), Detroit (5), Minneapolis (12), Milwaukee (20)
Minnesota	Minneapolis (12), Milwaukee (20)
Mississippi	New Orleans (17), Memphis (28)
Missouri	St Louis (19), Memphis (28), Des Moines (32), Kansas City (34)
Montana	Spokane (42)
Nebraska	Denver (22), Des Moines (32), Omaha (45)
Nevada	Los Angeles (2), San Francisco (4), Salt Lake City (36)
New Hampshire	Boston (8)
New Jersey	New York (1), Philadelphia (9)
New Mexico	Dallas (7), El Paso (39)
New York	New York (1), Buffalo (35)
North Carolina	Charlotte (6), Richmond (23)
North Dakota	Minneapolis (12)
Ohio	Detroit (5), Cleveland (16), Cincinnati (18), Pittsburgh (21), Columbus (38)
Oklahoma	Dallas (7), Kansas City (34), Little Rock (40), Oklahoma City (41), Wichita (46), Tulsa (48),
Oregon	Portland (30), Salt Lake City (36), Spokane (42)
Pennsylvania	New York (1), Philadelphia (9), Washington DC (10), Cleveland (16), Pittsburgh (21), Buffalo (35)
Rhode Island	Boston (8)
South Carolina	Charlotte (6), Atlanta (11)
South Dakota	Minneapolis (12), Denver (22), Des Moines (32)

State	MTAs covering state
Tennessee	Atlanta (11), Memphis (28), Birmingham (29), Nashville (43), Knoxville (44)
Texas	Dallas (7), Houston (14), San Antonio (33), El Paso (39)
Utah	Denver (22), Salt Lake City (36), El Paso (39)
Vermont	New York (1), Boston (8)
Virginia	Washington DC (10), Cincinnati (18), Richmond (23), Knoxville (44)
Washington	Seattle (24), Portland (30), Spokane (42)
West Virginia	Washington DC (10), Cincinnati (18), Pittsburgh (21), Columbus (38)
Wisconsin	Chicago (3), Minneapolis (12), Milwaukee (20), Des Moines (32)
Wyoming	Denver (22), Salt Lake City (36), Spokane (42)

Interstate BTAs

Market No.	Basic Trading Area	States	Population
B010	Allentown-Bethlehem-Easton, PA	PA, NJ	686,688
B013	Amarillo, TX	TX, NM, OK	380,341
B016	Anderson, SC	SC, GA	305,120
B026	Augusta, GA	GA, SC	521,822
B032	Baton Rouge, LA	LA, MS	623,657
B041	Billings, MT	MT, WY	290,242
B043	Binghamton, NY	NY, PA	356,645
B048	Bluefield, WV	WV, VA	184,020
B049	Blytheville, AR	AR, MO	79,446
B050	Boise-Nampa, ID	ID, OR	416,503
B051	Boston, MA	MA, NH	4,133,895
B061	Burlington, IA	IA, IL, MO	137,543
B066	Cape Girardeau-Sikeston, MO	MO, IL	181,795
B074	Charlotte-Gastonia, NC	NC, SC	1,671,037
B076	Chattanooga, TN	TN, GA	510,860
B078	Chicago, IL	IL, IN, WI	8,182,076
B081	Cincinnati, OH	OH, IN, KY	1,990,451
B083	Clarksville, TN-Hopkinsville, KY	TN, KY	220,469
B086	Clinton, IA-Sterling, IL	IA, IL	147,981
B087	Clovis, NM	NM, TX	71,024
B088	Coffeyville, KS	KS, OK	63,504
B092	Columbus, GA	GA, AL	342,333
B094	Columbus-Starkville, MS	MS, AL	166,415
B100	Cumberland, MD	MD, WV	156,707
B103	Danville, IL	IL, IN	114,241
B104	Danville, VA	VA, NC	165,434
B105	Davenport, IA-Moline, IL	IA, IL	419,650
B110	Denver, CO	CO, KS	2,073,952
B116	Dover, DE	DE, MD	251,257
B118	Dubuque, IA	IA, WI, IL	176,542
B119	Duluth, MN	MN, WI	400,771
B120	Dyersburg-Union City, TN	TN, KY	113,943
B126	Elkhart, IN	IN, MI	235,152
B127	Elmira-Corning-Hornell, NY	NY, PA	315,038
B128	El Paso, TX	TX, NM	649,860
B135	Evansville, IN	IN, IL, KY	504,859
B138	Fargo, ND	ND, MN	298,015
B139	Farmington, NM-Durango, CO	NM, CO, UT	162,776
B146	Florence, AL	AL, TN	173,076
B153	Ft. Smith, AR	AR, OK	282,187
B155	Ft. Wayne, IN	IN, OH	646,736
B162	Gallup, NM	NM, AZ	122,277
B168	Grand Junction, CO	CO, UT	187,062

B175	Greenville-Greenwood, MS	MS, AR	213,943
B177	Greenville-Spartanburg, SC	SC, NC	788,212
B179	Hagerstown, MD-Chambersburg, PA-Martinsburg, W	MD, PA, WV	327,693
B183	Harrisonburg, VA	VA, WV	128,910
B197	Huntington, WV-Ashland, KY	WV, KY, OH	363,936
B198	Huntsville, AL	AL, TN	439,832
B202	Idaho Falls, ID	ID, WY	190,267
B206	Iron Mountain, MI	MI, WI	44,596
B207	Ironwood, MI	MI, WI	33,059
B212	Jacksonville, FL	FL, GA	1,114,847
B215	Jamestown-Dunkirk, NY-Warren, PA	NY, PA	186,945
B220	Joplin, MO-Miami, OK	MO, KS, OK	215,095
B226	Kansas City, MO	MO, KS	1,839,569
B227	Keene, NH	NH, VT	111,709
B229	Kingsport-Johnston City, TN-Bristol, VA/TN	TN, VA	652,639
B231	Klamath Falls, OR	OR, CA	74,566
B234	La Crosse, WI-Winona, MN	WI, MN, IA	295,769
B245	Las Vegas, NV	NV, AZ	857,856
B249	Lebanon-Claremont, NH	NH, VT	167,576
B250	Lewiston-Moscow, ID	ID, WA	110,028
B251	Lewiston-Auburn, ME	ME, NH	221,697
B253	Liberal, KS	KS, OK	53,960
B258	Logan, UT	UT, ID	79,415
B263	Louisville, KY	KY, IN	1,352,955
B270	McCook, NE	NE, KS	36,618
B277	Mankato-Fairmont, MN	MN, IA	245,144
B279	Marinette, WI-Menominee, MI	WI, MI	65,468
B290	Memphis, TN	TN, AR, MS	1,396,390
B292	Meridian, MS	MS, AL	200,024
B295	Middlesboro-Harlan, KY	KY, TN	121,217
B298	Minneapolis-St. Paul, MN	MN, WI	2,840,561
B304	Monroe, LA	LA, AR	324,397
B315	Natchez, MS	MS, LA	73,214
B320	New Orleans, LA	LA, MS	1,367,169
B321	New York, NY	NY, CT, NJ, PA	18,050,615
B324	Norfolk-Virginia Beach-Newport News-Hampton, VA	VA, NC	1,635,296
B330	Olean, NY-Bradford, PA	NY, PA	239,343
B332	Omaha, NE	NE, IA	905,991
B339	Paducah-Murray-Mayfield, KY	KY, IL	217,082
B341	Paris, TX	TX, OK	89,422
B342	Parkersburg, WV-Marietta, OH	WV, OH	180,025
B346	Philadelphia, PA-Wilmington, DE-Trenton, NJ	PA, NJ, DE, MD	5,899,345
B355	Poplar Bluff, MO	MO, AR	148,240
B358	Portland, OR	OR, WA	1,690,930
B359	Portsmouth, OH	OH, KY	93,356
B364	Providence-Pawtucket, RI-New Bedford-Fall River, M	RI, MA	1,509,789
B367	Quincy, IL-Hannibal, MO	IL, MO	177,213

B369	Rapid City, SD	SD, WY	181,278
B372	Reno, NV	NV, CA	439,279
B381	Rock Springs, WY	WY, UT	56,981
B393	St. Joseph, MO	MO, KS	191,489
B394	St. Louis, MO	MO, IL	2,742,114
B399	Salt Lake City-Ogden, UT	UT, NV	1,308,035
B410	Savannah, GA	GA, SC	630,180
B411	Scottsbluff, NE	NE, WY	101,954
B418	Sherman-Denison, TX	TX, OK	151,914
B419	Shreveport, LA	LA, TX	583,266
B421	Sioux City, IA	IA, NE, SD	328,919
B422	Sioux Falls, SD	SD, IA	207,716
B425	Spokane, WA	WA, ID, MT	612,862
B431	Steubenville, OH-Weirton, WV	OH, WV	142,523
B439	Tallahassee, FL	FL, GA	418,963
B442	Terre Haute, IN	IN, IL	236,968
B443	Texarkana, TX/AR	TX, AR, OK	255,983
B457	Vincennes-Washington, IN	IN, IL	93,758
B460	Walla Walla, WA-Pendelton, OR	WA, OR	151,563
B461	Washington, DC	DC, VA, MD, W	4,118,628
B464	Watertown, SD	SD, MN	74,555
B470	West Plains, MO	MO, AR	67,165
B471	Wheeling, WV	WV, OH	219,937
B474	Williamson, WV-Pikeville, KY	WV, KY	185,682
B481	Worthington, MN	MN, IA	96,602
	Interstate BTA Population		90,083,639
	Total U.S. Population		252,556,719
	% Interstate BTA Population		35.67%

All population figures: U.S. Census, April 1990

Intrastate BTAs

Market No.	Basic Trading Area	State	Population
B001	Aberdeen, SD	SD	88,891
B002	Aberdeen, WA	WA	83,057
B003	Abilene, TX	TX	253,174
B004	Ada, OK	OK	52,677
B005	Adrian, MI	MI	91,476
B006	Albany-Tifton, GA	GA	324,899
B007	Albany-Schenectady, NY	NY	1,028,615
B008	Albuquerque, NM	NM	688,612
B009	Alexandria, LA	LA	280,133
B011	Alpena, MI	MI	63,429
B012	Altoona, PA	PA	222,625
B014	Anchorage, AK	AK	388,943
B015	Anderson, IN	IN	178,808
B017	Anniston, AL	AL	161,897
B018	Appleton-Oshkosh, WI	WI	399,261
B019	Ardmore, OK	OK	83,979
B020	Asheville-Hendersonville, NC	NC	510,055
B021	Ashtabula, OH	OH	99,821
B022	Athens, GA	GA	166,030
B023	Athens, OH	OH	123,864
B024	Atlanta, GA	GA	3,197,171
B025	Atlantic City, NJ	NJ	319,416
B027	Austin, TX	TX	899,361
B028	Bakersfield, CA	CA	543,477
B029	Baltimore, MD	MD	2,430,563
B030	Bangor, ME	ME	316,838
B031	Bartlesville, OK	OK	48,066
B033	Battle Creek, MI	MI	227,541
B034	Beaumont-Port Arthur, TX	TX	432,129
B035	Beckley, WV	WV	167,112
B036	Bellingham, WA	WA	127,780
B037	Bemidji, MN	MN	57,632
B038	Bend, OR	OR	102,745
B039	Benton Harbor, MI	MI	161,378
B040	Big Spring, TX	TX	34,589
B042	Biloxi-Gulfport-Pascagoula, MS	MS	339,791
B044	Birmingham, AL	AL	1,200,336
B045	Bismarck, ND	ND	123,682
B046	Bloomington, IL	IL	215,795
B047	Bloomington-Bedford, IN	IN	217,914
B052	Bowling Green-Glasgow, KY	KY	222,748
B053	Bozeman, MT	MT	65,077
B054	Brainerd, MN	MN	78,465

B055	Bremerton, WA	WA	189,731
B056	Brownsville-Harlingen, TX	TX	277,825
B057	Brownwood, TX	TX	57,684
B058	Brunswick, GA	GA	71,130
B059	Bryan-College Station, TX	TX	150,998
B060	Buffalo-Niagara Falls, NY	NY	1,231,795
B062	Burlington, NC	NC	108,213
B063	Burlington, VT	VT	369,128
B064	Butte, MT	MT	65,252
B065	Canton-New Philadelphia, OH	OH	513,623
B067	Carbondale-Marion, IL	IL	209,497
B068	Carlsbad, NM	NM	48,605
B069	Casper-Gillette, WY	WY	135,172
B070	Cedar Rapids, IA	IA	260,686
B071	Champaign-Urbana, IL	IL	222,312
B072	Charleston, SC	SC	624,369
B073	Charleston, WV	WV	481,387
B075	Charlottesville, VA	VA	190,128
B077	Cheyenne, WY	WY	103,939
B079	Chico-Oroville, CA	CA	206,918
B080	Chillicothe, OH	OH	93,579
B082	Clarksburg-Elkins, WV	WV	190,498
B084	Cleveland-Akron, OH	OH	2,894,133
B085	Cleveland, TN	TN	87,355
B089	Colorado Springs, CO	CO	409,482
B090	Columbia, MO	MO	190,536
B091	Columbia, SC	SC	568,754
B093	Columbus, IN	IN	139,128
B095	Columbus, OH	OH	1,477,891
B096	Cookeville, TN	TN	117,613
B097	Coos Bay-North Bend, OR	OR	79,600
B098	Corbin, KY	KY	128,186
B099	Corpus Christi, TX	TX	499,988
B101	Dallas-Ft. Worth, TX	TX	4,329,924
B102	Dalton, GA	GA	98,609
B106	Dayton-Springfield, OH	OH	1,207,689
B107	Daytona Beach, FL	FL	399,413
B108	Decatur, AL	AL	131,556
B109	Decatur-Effingham, IL	IL	247,608
B111	Des Moines, IA	IA	728,830
B112	Detroit, MI	MI	4,705,164
B113	Dickinson, ND	ND	38,001
B114	Dodge City, KS	KS	37,454
B115	Dothan-Enterprise, AL	AL	210,225
B117	Du Bois-Clearfield, PA	PA	124,180
B121	Eagle Pass-Del Rio, TX	TX	100,813
B122	East Liverpool-Salem, OH	OH	108,276

B123	Eau Claire, WI	WI	180,559
B124	El Centro-Calexico, CA	CA	109,303
B125	El Dorado-Magnolia-Camden, AR	AR	108,810
B129	Emporia, KS	KS	46,157
B130	Enid, OK	OK	85,998
B131	Erie, PA	PA	275,572
B132	Escanaba, MI	MI	46,082
B133	Eugene-Springfield, OR	OR	282,912
B134	Eureka, CA	CA	142,578
B136	Fairbanks, AK	AK	92,111
B137	Fairmont, WV	WV	57,249
B140	Fayetteville-Springdale-Rogers, AR	AR	222,526
B141	Fayetteville-Lumberton, NC	NC	571,328
B142	Fergus Falls, MN	MN	120,167
B143	Findlay-Tiffin, OH	OH	147,523
B144	Flagstaff, AZ	AZ	96,591
B145	Flint, MI	MI	500,229
B147	Florence, SC	SC	239,208
B148	Fond du Lac, WI	WI	90,083
B149	Ft. Collins-Loveland, CO	CO	186,136
B150	Ft. Dodge, IA	IA	131,731
B151	Ft. Myers, FL	FL	479,452
B152	Ft. Pierce-Vero Beach-Stuart, FL	FL	341,279
B154	Ft. Walton Beach, FL	FL	171,536
B156	Fredericksburg, VA	VA	124,654
B157	Fresno, CA	CA	755,580
B158	Gadsden, AL	AL	174,034
B159	Gainesville, FL	FL	260,538
B160	Gainesville, GA	GA	170,365
B161	Galesburg, IL	IL	75,574
B163	Garden City, KS	KS	65,059
B164	Glens Falls, NY	NY	118,539
B165	Goldsboro-Kinston, NC	NC	217,319
B166	Grand Forks, ND	ND	213,932
B167	Grand Island-Kearney, NE	NE	141,541
B169	Grand Rapids, MI	MI	916,060
B170	Great Bend, KS	KS	40,779
B171	Great Falls, MT	MT	161,038
B172	Greeley, CO	CO	131,821
B173	Green Bay, WI	WI	310,435
B174	Greensboro-Winston-Salem-High Point, NC	NC	1,241,349
B176	Greenville-Washington, NC	NC	218,937
B178	Greenwood, SC	SC	68,435
B180	Hammond, LA	LA	95,583
B181	Harrisburg, PA	PA	654,808
B182	Harrison, AR	AR	74,459
B184	Hartford, CT	CT	1,123,678

B185	Hastings, NE	NE	72,833
B186	Hattiesburg, MS	MS	161,894
B187	Hays, KS	KS	60,926
B188	Helena, MT	MT	58,752
B189	Hickory-Lenoir-Morganton, NC	NC	292,409
B190	Hilo, HI	HI	120,317
B191	Hobbs, NM	NM	55,765
B192	Honolulu, HI	HI	836,231
B193	Hot Springs, AR	AR	117,439
B194	Houghton, MI	MI	45,101
B195	Houma-Thibodaux, LA	LA	263,681
B196	Houston, TX	TX	4,054,253
B199	Huron, SD	SD	53,189
B200	Hutchinson, KS	KS	125,094
B201	Hyannis, MA	MA	204,256
B203	Indiana, PA	PA	89,994
B204	Indianapolis, IN	IN	1,321,911
B205	Iowa City, IA	IA	115,731
B208	Ithaca, NY	NY	94,097
B209	Jackson, MI	MI	193,187
B210	Jackson, MS	MS	615,521
B211	Jackson, TN	TN	255,379
B213	Jacksonville, IL	IL	70,795
B214	Jacksonville, NC	NC	149,838
B216	Janesville-Beloit, WI	WI	214,510
B217	Jefferson City, MO	MO	141,404
B218	Johnstown, PA	PA	241,247
B219	Jonesboro-Paragould, AR	AR	159,439
B221	Juneau-Ketchikan, AK	AK	68,989
B222	Kahului-Wailuku-Lahaina, HI	HI	100,504
B223	Kalamazoo, MI	MI	352,384
B224	Kalispell, MT	MT	59,218
B225	Kankakee, IL	IL	127,042
B228	Kennewick-Pasco-Richland, WA	WA	150,033
B230	Kirksville, MO	MO	55,563
B232	Knoxville, TN	TN	948,055
B233	Kokomo-Logansport, IN	IN	184,899
B235	Lafayette, IN	IN	247,523
B236	Lafayette-New Iberia, LA	LA	496,579
B237	La Grange, GA	GA	64,164
B238	Lake Charles, LA	LA	259,425
B239	Lakeland-Winter Haven, FL	FL	405,382
B240	Lancaster, PA	PA	422,822
B241	Lansing, MI	MI	489,698
B242	Laredo, TX	TX	152,881
B243	La Salle-Peru-Ottawa-Streator, IL	IL	148,331
B244	Las Cruces, NM	NM	197,166

B246	Laurel, MS	MS	79,145
B247	Lawrence, KS	KS	81,798
B248	Lawton-Duncan, OK	OK	177,830
B252	Lexington, KY	KY	816,101
B254	Lihue, HI	HI	51,177
B255	Lima, OH	OH	249,734
B256	Lincoln, NE	NE	309,515
B257	Little Rock, AR	AR	852,026
B259	Logan, WV	WV	43,032
B260	Longview-Marshall, TX	TX	292,659
B261	Longview, WA	WA	85,446
B262	Los Angeles, CA	CA	14,549,810
B264	Lubbock, TX	TX	392,901
B265	Lufkin-Nacogdoches, TX	TX	144,081
B266	Lynchburg, VA	VA	154,497
B267	McAlester, OK	OK	50,914
B268	McAllen, TX	TX	424,063
B269	McComb-Brookhaven, MS	MS	107,298
B271	Macon-Warner Robins, GA	GA	589,208
B272	Madison, WI	WI	593,145
B273	Madisonville, KY	KY	46,126
B274	Manchester-Nashua-Concord, NH	NH	540,704
B275	Manhattan-Junction City, KS	KS	122,878
B276	Manitowoc, WI	WI	80,421
B278	Mansfield, OH	OH	221,514
B280	Marion, IN	IN	109,238
B281	Marion, OH	OH	92,023
B282	Marquette, MI	MI	79,859
B283	Marshalltown, IA	IA	55,695
B284	Martinsville, VA	VA	90,577
B285	Mason City, IA	IA	118,834
B286	Mattoon, IL	IL	62,314
B287	Meadville, PA	PA	86,169
B288	Medford-Grants Pass, OR	OR	209,038
B289	Melbourne-Titusville, FL	FL	398,978
B291	Merced, CA	CA	192,705
B293	Miami-Ft. Lauderdale, FL	FL	3,270,606
B294	Michigan City-La Porte, IN	IN	107,066
B296	Midland, TX	TX	111,567
B297	Milwaukee, WI	WI	1,751,525
B299	Minot, ND	ND	122,687
B300	Missoula, MT	MT	139,270
B301	Mitchell, SD	SD	84,095
B302	Mobile, AL	AL	594,397
B303	Modesto, CA	CA	418,978
B305	Montgomery, AL	AL	440,745
B306	Morgantown, WV	WV	104,546

B307	Mt. Pleasant, MI	MI	118,558
B308	Mt. Vernon-Centralia, IL	IL	119,286
B309	Muncie, IN	IN	182,386
B310	Muskegon, MI	MI	206,974
B311	Muskogee, OK	OK	148,267
B312	Myrtle Beach, SC	SC	144,053
B313	Naples, FL	FL	152,099
B314	Nashville, TN	TN	1,429,309
B316	New Bern, NC	NC	154,955
B317	New Castle, PA	PA	96,246
B318	New Haven-Waterbury-Meriden, CT	CT	978,311
B319	New London-Norwich, CT	CT	357,482
B322	Nogales, AZ	AZ	29,676
B323	Norfolk, NE	NE	112,526
B325	North Platte, NE	NE	80,249
B326	Ocala, FL	FL	194,833
B327	Odessa, TX	TX	213,420
B328	Oil City-Franklin, PA	PA	105,882
B329	Oklahoma City, OK	OK	1,305,472
B331	Olympia-Centralia, WA	WA	258,937
B333	Oneonta, NY	NY	107,742
B334	Opelika-Auburn, AL	AL	124,022
B335	Orangeburg, SC	SC	114,458
B336	Orlando, FL	FL	1,256,429
B337	Ottumwa, IA	IA	122,988
B338	Owensboro, KY	KY	157,104
B340	Panama City, FL	FL	171,195
B343	Pensacola, FL	FL	344,406
B344	Peoria, IL	IL	455,643
B345	Petoskey, MI	MI	85,863
B347	Phoenix, AZ	AZ	2,404,760
B348	Pine Bluff, AR	AR	152,918
B349	Pittsburg-Parsons, KS	KS	90,934
B350	Pittsburgh, PA	PA	2,507,839
B351	Pittsfield, MA	MA	139,352
B352	Plattsburgh, NY	NY	123,121
B353	Pocatello, ID	ID	89,651
B354	Ponca City, OK	OK	48,056
B356	Port Angeles, WA	WA	76,610
B357	Portland-Brunswick, ME	ME	471,614
B360	Pottsville, PA	PA	152,585
B361	Poughkeepsie-Kingston, NY	NY	424,766
B362	Prescott, AZ	AZ	107,714
B363	Presque Isle, ME	ME	86,936
B365	Provo-Orem, UT	UT	269,407
B366	Pueblo, CO	CO	266,001
B368	Raleigh-Durham, NC	NC	1,089,423

B370	Reading, PA	PA	336,523
B371	Redding, CA	CA	253,255
B373	Richmond, IN	IN	104,942
B374	Richmond-Petersburg, VA	VA	1,090,869
B375	Riverton, WY	WY	46,859
B376	Roanoke, VA	VA	609,215
B377	Roanoke Rapids, NC	NC	76,314
B378	Rochester-Austin-Albert Lea, MN	MN	233,167
B379	Rochester, NY	NY	1,118,963
B380	Rockford, IL	IL	412,120
B382	Rocky Mount-Wilson, NC	NC	199,296
B383	Rolla, MO	MO	98,233
B384	Rome, GA	GA	115,066
B385	Roseburg, OR	OR	94,649
B386	Roswell, NM	NM	70,068
B387	Russellville, AR	AR	81,863
B388	Rutland-Bennington, VT	VT	97,987
B389	Sacramento, CA	CA	1,656,581
B390	Saginaw-Bay City, MI	MI	615,364
B391	St. Cloud, MN	MN	243,888
B392	St. George, UT	UT	83,263
B395	Salem-Albany-Corvallis, OR	OR	440,062
B396	Salina, KS	KS	143,408
B397	Salinas-Monterey, CA	CA	355,660
B398	Salisbury, MD	MD	163,043
B400	San Angelo, TX	TX	155,845
B401	San Antonio, TX	TX	1,530,954
B402	San Diego, CA	CA	2,498,016
B403	Sandusky, OH	OH	133,019
B404	San Francisco-Oakland-San Jose, CA	CA	6,420,984
B405	San Luis Obispo, CA	CA	217,162
B406	Santa Barbara-Santa Maria, CA	CA	369,608
B407	Santa Fe, NM	NM	174,526
B408	Sarasota-Bradenton, FL	FL	513,348
B409	Sault Ste. Marie, MI	MI	51,041
B412	Scranton-Wilkes Barre-Hazleton, PA	PA	678,410
B413	Seattle-Tacoma, WA	WA	2,708,949
B414	Sedalia, MO	MO	79,705
B415	Selma, AL	AL	74,457
B416	Sharon, PA	PA	121,003
B417	Sheboygan, WI	WI	103,877
B420	Sierra Vista-Douglas, AZ	AZ	97,624
B423	Somerset, KY	KY	111,487
B424	South Bend-Mishawaka, IN	IN	330,821
B426	Springfield, IL	IL	254,696
B427	Springfield-Holyoke, MA	MA	672,970
B428	Springfield, MO	MO	532,880